

CLAIMS

What Is Claimed Is:

- 1 1. A system for analyzing elements in sample comprising:
2 a heating member comprising one of a high-frequency heating furnace
3 and an electric resistance furnace for receiving the sample;
4 a source of oxygen gas connected tot he heating member to supply
5 oxygen gas to the heating member as the sample is heated to gasify the
6 elements in the sample;
7 a mass spectrometer; and
8 a conduit connecting the heating member to the mass spectrometer
9 whereby the gasified elements are analyzed quantitatively to determine at least
10 an element of C, S, and N.
- 1 2. The system of Claim 1 further including a feedback circulating system
2 for recirculating the gasified elements to the heating member until all of the elements
3 in the sample are adequately gasified.
- 1 3. A system for analyzing elements contained is a sample comprising:
2 an impulse furnace for receiving the sample;
3 a graphite crucible for holding the sample in the impulse furnace, while
4 the sample is heated and fused;
5 a source of an inert gas is connected to the impulse furnace to supply
6 inert gas while the elements in the sample are gasified; and

7 a mass spectrometer connected to the impulse furnace for receiving the
8 gasified elements whereby a quantitative analysis of the amount of elements
9 are determined.

1 4. The system of Claim 3 wherein the elements are at least one of O, N
2 and H.

1 5. The system of Claim 3 further including a feedback circulating system
2 for recirculating the gasified element to the impulse furnace until all of the elements in
3 the sample are adequately gasified.

1 6. The system of Claim 3 further including a dust collector and a
2 dehumidifier are provided in the connection from the impulse furnace to the mass
3 spectrometer.

1 7. A system for analyzing elements contained in a sample, comprising:
2 an electric resistance furnace for receiving a sample;
3 a source of hydrogen gas connected to the electric resistance furnace to
4 supply hydrogen gas as the sample is heated to gasify the elements in the
5 sample; and

6 a mass spectrometer connected to the electric resistance furnace for
7 receiving the gasified elements whereby a quantitative analysis of the amount
8 of elements are determined.

1 8. The system of Claim 7 wherein the elements are at least one of C, S
2 and N.

1 9. The system of Claim 7 further including a feedback circulating system
2 for recirculating the gasified elements to the electric resistance furnace until all of the
3 elements in the sample are adequately gasified.

1 10. The system of Claim 7 further including a dust collector and a
2 dehumidifier are provided in the connection from the electric resistance furnace to the
3 mass spectrometer.

1 11. The system of Claim 9 further including means for providing an
2 electric field to ionize the gasified elements prior to an introduction into the mass
3 spectrometer.

1 12. A system for analyzing elements contained in a sample, comprising:
2 a sample cell for holding a sample;
3 a laser device for providing a laser beam to irradiate the sample in the
4 sample cell and to gasify at least a portion of the sample; and
5 a mass spectrometer connected to the sample cell for receiving the
6 gasified sample to analyze quantitatively elements in the sample.

1 13. The system of Claim 12 further including a source of gas connected to
2 the sample cell for introducing the gas during the irradiation of the sample with the
3 laser beam.

1 14. The system of Claim 13 wherein the gas source is one of oxygen and
2 an inert gas and the mass spectrometer is calibrated to detect at least one of carbon,
3 sulfur, nitrogen and hydrogen.

1 15. The system of Claim 13 wherein the gas source is oxygen and the mass
2 spectrometer is calibrated to detect at least one of carbon and sulfur.

1 16. The system of Claim 13 wherein the gas source is an inert gas and the
2 mass spectrometer is calibrated to detect at least one of nitrogen and hydrogen.

1 17. The system of Claim 13 wherein the gas source is a mixture of
2 hydrogen and an inert gas and the mass spectrometer is calibrated to detect at least one
3 of carbon, sulfur and nitrogen.

1 18. The system of Claim 13 wherein the sample cell includes a window
2 transparent to the laser beam and an open side opposite to the window for mounting
3 the sample and means for sealing the sample to the sample cell.

1 19. The system of Claim 17 further including means for pressing the
2 sample into sealing contact and means for moving the sample cell.

1 20. The system of Claim 19 further including a gas jetting nozzle
2 connected to the source of gas for directing the gas towards the sample mounted in the
3 sample cell.

1 21. A system for analyzing elements contained in a metal sample,
2 comprising:

3 a sample cell for holding the metal sample;

4 a high-frequency coil positioned in the sample cell for levitating the
5 metal sample when it is energized;

6 means for heating and fusing the metal sample to gasify elements
7 contained in the metal sample; and

8 a mass spectrometer connected to the sample cell for receiving the
9 gasified sample to analyze quantitatively elements in the sample.

1 22. The system of Claim 21 wherein the means for heating and fusing the
2 metal includes the high-frequency coil to induce a current in the metal sample.

1 23. The system of Claim 21 further including a source of gas connected to
2 the sample cell for introducing the gas during the heating and fusing of the metal
3 sample.

1 24. The system of Claim 21 wherein the gas source is one of an inert gas
2 and an oxygen gas and the mass spectrometer is calibrated to detect at least one of
3 carbon, sulfur, nitrogen and hydrogen.

1 25. The system of Claim 24 wherein the gas source is an inert gas and the
2 mass spectrometer is calibrated to detect at least hydrogen.

1 26. The system of Claim 24 further including means for moving the high-
2 frequency coil vertically along a longitudinal direction of the sample cell.